The Use of Case Based Multiple Choice Questions for Assessing Large Group Teaching: Implications on Student's Learning

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Abstract

The practice of assessments in third level education is extremely important and a rarely disputed part of the university curriculum as a method to demonstrate a student's learning. However, assessments to test a student's knowledge and level of understanding are challenging to apply given recent trends which are showing that student numbers are increasing, student demographics are wide ranging and resources are being stretched. As a result of these emerging challenges, lecturers are required to develop a comprehensive assessment to effectively demonstrate student learning, whilst efficiently managing large class sizes. One form of assessment which has been used for efficient assessment is multiple choice questions (MCQs); however this method has been criticised for encouraging surface learning, in comparison to other methods such as essays or case studies.

This research explores the impact of blended assessment methods on student learning. This study adopts a rigorous three-staged qualitative methodology to capture third level lecturers' and students' perception to (1) the level of learning when using MCQs; (2) the level of learning when blended assessment in the form of case based MCQs are used. The findings illuminate the positive impact of cased based MCQs as students and lecturers suggest that it leads to a higher level of learning and deeper information processing over that of MCQs without case studies.

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The implications of this research is that this type of assessment contributes to the current thinking within literature on the use of assessments methods, as well as the blending of assessment methods to reach a higher level of learning. It further serves to reinforce the belief that assessments are the greatest influence on students' learning, and the requirement for both universities and lecturers to reflect on the best form of assessment to test students' level of understanding, whilst also balancing the real challenges of large class size teaching.

Keywords: Assessments, Case Studies, Knowledge, Learning, Multiple Choice Questions, University

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Introduction

> *Assessment methods and requirements probably have a greater influence on how and what students learn than any other factor. This influence may well be of greater importance than the impact of teaching materials* (Boud, 1988, pp.39-40).

The use of assessments in third level education is regarded as pivotal today in dictating the level of learning that a student performs in order to complete, pass or to succeed in an assessment. In fact assessments are perceived as "critical to the success of any educational program and is essentially a gate keeping mechanism through which people do or do not make progress in their chosen profession" (Brady, 2005, p.238). As highlighted by both Brady (2005) and Boud (1988), assessments have a significant affect and effect on students' learning. Assessments ultimately provide ways in which lecturers can certify achievement, aid learning, and foster lifelong learning. Freeman & Lewis (1998, p.314) suggested that assessments are "any process that aims to judge the extent of student's learning". Assessment according to Race (1995, p.61) drives learning through motivation, where "motivation concerns forming goals and making an effort to achieve them", or equally defined as "wanting to learn".

The challenge for lecturers is to use the best type of assessment method to capture, reflect and to motivate the level of learning and understanding of a student (Gosling & Moon, 2001). However "large classes constitute a real challenge' to every lecturer due to "diversity of students, lack of flexibility, class climate management, difficulty of setting and enforcing classroom behaviour" (Fortes & Tchantchane, 2010, p.272), which ultimately impacts on the lecturer's ability to monitor students' learning and engagement within the module. It is evident that the environment for learning within higher education is characterised by "uncertainty, complexity and fast-paced changes" (Von der Heidt & Quazi, 2013, p.258),

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which challenges lecturers to respond to this environment with new and innovative methods of efficient and effective assessment.

This research is set within a third level Irish institution, focused on one (large class) first year undergraduate Marketing module. Over the past three years, this module has experienced an increase in class size year on year; in 2011 (492 students), 2012 (512 students) and in 2013 (532 students). The researcher has been and is responsible for creating an assessment which motivates, captures and reflects students' learning, but in an efficient manner.

This paper discusses research that was undertaken to assess the use of one particular assessment method - multiple choice questions (MCQs) on one large group, with a focus on case based MCQs and ultimately exploring the implications on the students' learning. The following literature provides insight into the advantages and disadvantages of technology and MCQs on large class assessment, with insight provided into the use of case studies for assessment.

Literature Review

Assessment is integral to the learning experience and to curriculum design (Biggs, 1999), and is typically used to evaluate student learning outcomes (Michlitsch & Sidle, 2002). According to Angelo & Cross (1993, p.32) assessment is defined as "the multi-dimensional process" in which learning is appraised and feedback used to improve teaching. However, despite this importance, "assessment remains the aspect of the curriculum teaching and learning practices that is least amenable to change" (Scarino, 2013, p.310). Therefore lecturers are challenged in their ability to deliver assessments that do sway from the 'norm'. This is undoubtedly

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"because of the traditional pressure in assessment towards objectivity, conformity, consistency and certainty" (Scarino, 2013, p.310).

Despite the challenges of making changes to assessments, there has been a need for 'change' due to the increasing trends in class sizes and limited resources for teaching. Extant literature has explored various innovations for assessments over the years, with the use of technology and MCQs being highlighted as the main ways of coping with larger group teaching (Gibb, 2010). This method has been typically used in Science related programmes to date, but are being introduced to more Social Science programmes as of late. Advantages of good MCQs include low grading costs, perceived objectivity, and availability of comparative statistical analysis. Scholars such as Brady (2005) and Pamplett & Farnill (1995) suggest that the practicality of MCQs is the fact that the method can test large number of students on a wide range of course material, in a short time.

The contested disadvantage to MCQs according to Gibbs (2010, p.10) is the belief that MCQs "commonly mis-orient students to adopt a surface approach involving memorising". This existing belief criticises MCQs for testing only superficial learning, a regurgitation of facts and lacks validity (Pamplett & Farnill, 1995; Mayer, 2002). In terms of learning, for example, leading literature by Bloom (1956) stated that the validity of MCQs is challenged "especially their ability to consistently measure the desired higher order learning outcomes" (Brady, 2005: p.240). There appears to be a debate by Masters *et al.* (2001) which suggests that MCQs can competently evaluate knowledge, comprehension, application and analysis levels within Bloom's Taxonomy (1956); however, is unlikely to address levels such as synthesis and evaluation levels which free response systems (essay) can. However, much debate within the extant literature suggests that free response systems may not in fact measure higher levels

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of understanding over that of MCQs (Buckles & Siegfried, 2006). Well structured and highly developed MCQs, although require more time in set up, can be aligned with higher order learning, and may prove just as robust in evaluating students' in-depth learning as free response systems. This debate is furthered by Morrission & Free (2001, p.17) who suggest that "designing questions that require knowledge of multi-logical thinking and using plausible alternatives to the correct answer... will increase the ability of MCQs to measure critically thinking skills".

There are multiple forms in which assessments can take place, and it is suggested that assessments are diversified in order to be fairer to the students (Race & Brown, 2001, p.41). The assessment of MCQs for example can be combined with other assessment methods to provide a more comprehensive strategy for student learning (Brady, 2005). Other forms of assessments include peer assessment, case based assessment, and portfolio assessment (Struyven *et al.*, 2006). One popular form of teaching and learning methods within business is case studies. Traditionally case studies have been associated with higher-order learning, regarded as a powerful learning tool and one method which depict 'real-life situations' (UNSW, 2013). This is reiterated by Michlitsch & Sidle (2002, p.125) who reported this method to be "the most effective method for measuring student learning".

Based on this understanding of literature, the focus of this research is to explore (retrospectively) lecturers' and students' perceptions of the value of MCQs and case based MCQs in assessing student learning in large groups.

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Methodology

The research was undertaken in one Department at the University between July 2013-November 2013, using exploratory research through three forms of data capture: qualitative semi-structured interview, open ended questionnaires, and focus group interviews. Three semi-structured interviews were recorded with three lecturers who have at least two plus year's experience at using MCQs for large class assessment.

Stage One: Interview questions were derived based on core literature on the strength and weaknesses of MCQs as well as feedback from lecturers during the interview period. For example, questions included: What is your preferred form of assessment? Why do you choose to use Multiple Choice Questions for Assessment? What do you perceive are the advantages of using MCQs for assessment? Are there any disadvantages of using MCQs for assessment? The three lecturers interviewed have used MCQ assessment for a number of years with one of the three lecturers using the blended assessment of case based MCQs.

Stage Two: Based on feedback from Stage One an open ended questionnaire was created. Questions captured the students' experience of MCQs prior to their first year of study at third level, their initial reaction to being assessed by MCQs, their actual experience of being assessed by MCQs, the students' experience of blended assessment of MCQs and case study, and the overall learning and study required in preparing for both type of assessment. This questionnaire was distributed to second year Business students on day 1 of Semester Two. A total of 71 completed questionnaires were received, with 33 male and 38 female respondents. These students were selected based on their completion of the first year undergraduate module in Semester 2 of Year 1 (Year 2012/13).

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Stage Three: Two mixed focus group interviews, consisting of 5 students of varied age and progression background were carried out after the completion of the questionnaire to provide more qualitative feedback on the students' experience of MCQs, case based MCQs and assessments in general.

Findings

Interviews

When the lecturers where asked what would be their ideal form of assessment if resources and time were not a barrier, they suggested an essay format as they perceived it as allowing for more critical thinking and writing. However, lecturers suggested that a blended approach to assessment was favourable. Findings deriving from the semi structured interview with lecturers suggested that MCQs provided some form of reassurance that the assessments were corrected fairly and it rewarded students who completed the work. In terms of level of assessment, one lecturer suggested it:

> *Assesses the foundational knowledge or core concepts of the module* (MCH)

Interestingly, the lecturers found that the introduction of case based MCQs provided a higher level of learning, stating:

> *Case based MCQs blend theory with practice* (MCH)
>
> *Case studies go deeper, more critical thought required* (US)

Overall lecturers are acutely aware of the challenges students face with assessments in general:

> *It's like being in a Quiz Show on TV and being put on the spot but they flounder. I am aware that students learn differently* (MCH)

Questionnaires

Out of the 71 students questioned, only 24 of the students had experienced MCQs prior to university assessment; however no student had experienced case based MCQs. On retrospect, over 90% of students had a 'good' initial reaction to being assessed through MCQs. Multiple reasons suggested for favouring MCQs were:

> *Having options increases likelihood of quick info recall*

> *Good. Because if you know your stuff you will do well. But if you don't it can be difficult and can be a guessing game*

> *Good, felt it fair and means exam isn't based on how much you can write!*

> *Good as it tested your knowledge of a wide area of things within a short period of time*

> *Good, makes you think more than just rambling to fill in the space for an answer, makes you think about the question*

> *Good, because they are more interesting to answer*

Despite this reaction being largely positive, some students suggested that it was 'good' for the simple reason, that it was perceived easier to pass:

> *Good. 4 possible answers and 25% chance of being correct*

A minority of students did not favour MCQs for assessment as they suggested it did not reflect their level of knowledge, or it proved 'tricky' as stated:

> *Personally I didn't like MCQs as a lot of the answers were similar, so you thought you were being caught out*

After completion of MCQs, over 65 out of the 71 students rated their initial reaction *good* in relation to the use of MCQs for assessment purposes and the majority of students rated their experience of MCQs as *OK* or 'I liked using MCQs'. The questionnaire proceeded in determining the students' reaction to case based MCQs, with over 50% of those questioned

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finding the case based MCQs more difficult. This was largely challenging, as students felt they were required to think further, as one student commented that "there was no straight answer to the questions".

Other comments included the following:

Harder because you had to apply your knowledge to everyday situations

I found it harder as it wasn't straight forward. I had to really think before answering

In general the other 50% of students suggested it was 'easier' or much better to complete as it challenged them more, and they found the case study text helped to stimulate answers, to think harder, and to apply their learning from the lectures:

Easier as you could use more of your own interpretation

The completion of the blended case based MCQs in general took students an increased time to complete within the examination, with students suggesting that it involved more time to read and process the case study before aligning a correct MCQ answer to the case question. It also made students require a higher level of information processing:

I had to really think before answering

I needed more time to read and understand

Longer, required more thinking

Mixed Focus Groups

More in-depth discussion through the focus group interviews re-emphasised students' reaction to MCQs. The students discussed the importance of trying to understand the trick of the question and then the questions, as well as getting 'used' to the wording in the MCQ

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exam. In general the majority of students engaged did not think that MCQs should be applied to a theory and practice module such as Marketing. However, the majority of students liked the case based MCQs as they had to 'think more', 'relate', 'jog memory back to the class', 'required more time to complete', 'thinking in a broader base', and they could see the value of this blended assessment for the module stating 'it is theory applied, basically'.

Interestingly the use of the word 'stress' was raised several times throughout the two focus group discussions by both males and females when discussing assessments in general, as well as specific exam formats. Conflicting opinions were provided on exam formats and stress levels, which naturally impacted students' ability to learn.

Discussion

Brady (2005) suggests when deciding on assessments, lecturers are carrying out an ethical activity, and that they must be confident and justified in the assessment that they are have chosen. In this research study, it is evident from the lecturers' perspective that MCQ based examinations are utilised as a result primarily of limited resources, and are used in the majority of cases to address the need to assess a large class of students in a short time. When the lecturers were asked what would be their ideal form of assessment if resources and time allowed, they suggested the essay format over that of MCQs. However, the adoption of blended assessment in the form of case based MCQs is favoured by lecturers for use in assessment of large class sizes and is regarded as stimulating a higher level of learning, by applying theory and practice in a more engaging assessment format.

The above findings emerging from the lecturer interviews were supported by both the students' questionnaire and focus group interviews. Ultimately the majority of students found

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the MCQ format favourable. The students perceived the straight MCQs as providing a lower level of learning, in contrast to the blended assessment of case based MCQs which required more time, more application of their knowledge and deeper thinking.

The findings serve to reinforce current thinking on the weaknesses and advantages of using MCQs (Buckles & Siegfried, 2006; Gibbs, 2010; Brady, 2005), as well as supporting the belief that a blended approach to assessment is fairer to the students (Race & Brown, 2001, p.41) and allows for a more effective measuring of student learning (Michlitsch & Sidle, 2002).

Implications of Research

The research study highlights the central role of assessments for learning, and the importance of assessment, not as an end in itself but a vehicle for educational improvement (Banta *et al*., 1996). Therefore the implications of this research impact not only on students, but also on lecturers and the literature.

The blended assessment of case based MCQs proposes a successful way in which students can be assessed which will reflect and demonstrate an effective level of learning and understanding as highlighted in the curriculum. Through the use of case based MCQs, students can think deeper for longer. Going forward, potentially the use of PeerWise as a system or student generated questions (SGQs) for learning would assist the students during the semester; this would allow for students to create a database of potential MCQs as well as vignettes within the SQGs for assessment practice (Casey, 2013; Schullo-Feulner *et al*., 2014). This could increase the engagement of students during the module, as well as their skill development in writing questions.

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The challenge for lecturers is to use the best type of assessment method to capture, reflect and to motivate the level of learning and understanding of a student (Gosling & Moon, 2001), whilst addressing increasing class sizes in a fast paced and changing educational environment (Foortes & Tchantchane, 2010; Von der Heidt & Quazi, 2013). Lecturers require further training on the importance of the variation of assessment methods. This would assist with educating lecturers that other assessment methods can meet and surpass the level of learning and understanding that traditional essays are believed to create. The key implication for lecturers from this research in adopting a blended assessment of case based MCQs, relates directly to the assessment preparation. Case studies must be original and be designed to require knowledge of multi-logical thinking (Morrission & Free, 2001). This preparation and design of assessment will be time intensive to create prior to the delivery of assessments.

The key implication for academic practice is that this research serves to reinforce Boud's (1988) belief that assessments are the greatest influence on students' learning. It is evident from the study that students approached the blended case based MCQs assessment more intensively than the MCQs assessment, and that it required more time, a higher level of learning (Blooms, 1956) and increased critical thought (Morrission & Free, 2001).

Future Research

It is proposed that future research may evolve from this study which investigates the creation of relevant and relatable case studies for case based MCQs, leading to potentially optimal levels of student learning. One emergent theme which was raised at several stages in the data capture was the element of stress. Potentially research on the issue of stress and assessments could be explored further both for students and lecturers to better understand ways in which stress can be prevented or addressed in relation to assessments.

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